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C-A OPERATIONS PROCEDURES MANUAL

2.28.i Conducting Effective Pre-Job Briefings, Walk-Downs and Post-Job Reviews

Text Pages 2 through 12

Attachments

Hand Processed Changes

HPC No.	Date	Page Nos.	Initials

Approved: _____***Signature on File***_____ _____
Collider-Accelerator Department Chairman Date

R. Karol

2.28.i Conducting Effective Pre-Job Briefings, Walk-downs and Post-Job Reviews

1. Purpose

1.1 A pre-job briefing helps all those involved to understand the scope of what is to be accomplished (big picture), limits and precautions, task sequences, required PPE and roles and responsibilities for a task. An effective pre-job briefing requires an intelligent conversation — a dialogue among all participants — about a specific task to prepare workers for not only desired *accomplishments*, but also to address what to *avoid*. The "avoid" dialogue should sensitize workers to "see" error-likely situations, especially at critical steps or phases of the activity. Conduct pre-job briefings not only for infrequently performed or complex tasks, but also consider for the so-called *routine* jobs. Experience reveals that most events occur during routine activities. The dialogue is enhanced by the use of relevant *operating experience*—how mistakes have been made before.

1.2 A pre-job walk-down provides an opportunity to see the jobsite firsthand and assess the physical aspects of the job. For example, interferences of equipment or other work done simultaneously; verify adequate clearance boundaries; verify safety equipment needs; determine if there is adequate lighting, the need for temporary power; see where radiological contamination or hot spots are located; verify proper tool and parts are available; verify adequate resources are available for the work; validate the job scope, etc.

1.3 Post-job reviews allow a formal means to provide/document feedback so that similar future work or operations can benefit from problems encountered during the performance of the task. Feedback is also a way to document good performance.

2. Conducting a Pre-job Briefing

2.1 An effective pre-job briefing should occur face-to-face. The conversation should address error-prevention in a round-robin fashion. Consideration of the task details in such a way provides an opportunity for others to clarify expectations and to challenge assumptions and inaccurate risk perceptions.

2.2 Consider conducting "reverse" pre-job briefings by directing a technician or operator to lead the discussion. In this case, the first-line supervisor or work planner functions as a facilitator. This approach improves the engagement of the workers in their preparation for the task.

2.3 Adopt the practice of asking one final question before concluding the pre-job briefing. Typically, the supervisor would ask, "Are you prepared to do this job error-free?"

2.4 Assumptions should be challenged to detect unsafe attitudes and inaccurate mental models regarding the task. Inaccurate mental models promote erroneous assumptions that may lead to errors and serious misunderstandings of the true equipment, system, or plant state. Minimizing assumptions reduces uncertainty by improving one's situation awareness and questioning attitude toward the activity. Challenging assumptions improves mental models. Also, thinking about what could happen, especially worst case, and its likelihood will help workers be more explicit in their communications and deliberate in the physical performance of task elements. This is no time for "professional courtesy." Workers as well as supervisors must be concerned with "what's right," not "who's right."

2.5 Changes to the work plan may be necessary before workers proceed with the task to minimize the opportunity for error and an event. A task reviewed during a pre-job briefing will help workers and supervisors become more aware of margins for safety, necessary precautions to preclude error, and contingencies for potential consequences.

2.6 Just because a job has some error traps embedded in it does not mean the job cannot proceed safely. Taking practical precautions, work can still be accomplished as planned and scheduled. However, error is not a generality. Specific defenses must be employed. If particular error precursors cannot be eliminated, then integrate appropriate defenses into the work plan. Stop Work criteria should be explicitly defined, especially for risk-significant tasks. A final option is to NOT perform the job, given present job-site conditions.

3. Guidance for the Level of Pre-job Briefing

3.1 Extensive pre-job briefings do not have to be performed for every activity. Tasks are simple or complex, repetitive or infrequent, low or high risk. Using these factors, the table below provides guidance on the depth of prejob briefings to be conducted.

	Low-Risk	**High-Risk**
Simple or Repetitive	**SAFER (see Attachment 1) Dialogue**	**Preplanned Pre-job Briefing Forms** **Plus SAFER**
Complex or Infrequent	**Generic Pre-job Briefing Checklist** **Plus SAFER**	**Infrequently Performed Test or Evolution** **Plus SAFER**

3.1.1 A *simple* task is one that involves few interactions with plant equipment, indications, or other individuals and is not time-dependent.

3.1.2 A *repetitive* task is one that involves repeated actions.

3.1.3 A *complex* task involves multiple interactions with plant equipment, indications, additional procedures, and other individuals or team members. Some system or plant responses may be masked, difficult to anticipate. Usually, timeliness is associated with such tasks, and the greater the number of interactions within a short time frame, the greater the opportunity for error.

3.1.4 An *infrequent* activity involves evolutions that are seldom performed, even though covered by existing normal or abnormal procedures (for example, plant or equipment startup after a prolonged outage, or after any outage that involves significant changes to systems, equipment, or procedures related safety).

3.1.5 *Low risk* involves little or no consequence to personnel, environment, or equipment should a mistake occur.

3.1.6 A *high-risk* task is risk-significant with respect to safety of personnel and environment and reliability of the plant and has potential significant consequences to personnel, environment or safety should error occur.

3.1.7 Whether an activity is simple or complex it is important to recognize which risk-significant activities are also classified as error-prone. An error-prone activity is one with a history of error, or that exhibits error precursors at the job site that are particularly potent for the individuals assigned.

3.2 **Simple/Repetitive and Low-Risk.** If a task is simple and low-risk, then, as a minimum, the individual assigned the task should mentally talk through SAFER (See Attachment 1.0) with him- or herself - before starting the task, remembering that the majority of events originate during *routine* tasks. Depending on the judgment of the work planner/supervisor, the pre-job briefing might involve a dialogue with the worker. **Regardless of the complexity or level of risk, a task preview must be conducted.** SAFER should be used to sensitize personnel to error traps and potential consequences of human error. Even if a pre-job briefing is not done, a single individual can think through the series of questions SAFER poses, whatever the activity.

3.3 **Simple/Repetitive and High-Risk.** The content of these pre-job briefings is adapted with respect to task, workplace, and worker factors specific to the activity on that particular day.

3.4 **Complex/Infrequent and Low-Risk.** The pre-job briefing is adapted to consider the unique conditions specific to the particular task and individual(s) assigned.

3.5 **Complex/Infrequent and High-Risk**. These evolutions fall into the category of infrequently performed tasks or evolutions. These types of activities can significantly degrade the level of safety. Consider as high-risk activities those that place plant equipment in unusual configurations, require complex coordination or sequencing, or involve major changes to plant components, operating procedures, or test methods.

4. Common Shortcomings with Pre-job Briefings

4.1 Experience has shown the following circumstances (in no particular order) have been observed during, or associated with, ineffective pre-job briefings:

4.1.1 Generalities, rather than specifics, used

4.1.2 No discussion of error traps, possible consequences, and needed defenses for each critical step

4.1.3 Error-prevention techniques or other defenses not adapted or tailored to specific demands of the task

4.1.4 Conducted as a monologue; no active engagement by others

4.1.5 No planning for the conduct of the pre-job briefing; no time allowed for workers to prepare

4.1.6 Principal participants not all present for briefing

4.1.7 Supervisor responsible for conducting multiple pre-job briefings at the same time

4.1.8 No consideration of the scope of the task or when the original task becomes a “new” task

4.1.9 A checklist of several hundred items to cover used during a pre-job briefing

4.1.10 Conducted in a distracting location

5. Pre-job Walkdowns

5.1 Pre-job walk-downs should be considered if the work could cause loss of major required equipment, stop the experimental program, present a moderate or high hazard risk (although they should be considered for skill-of –the-worker jobs, complex jobs with many steps, jobs involving coordination of several groups especially if they are non-C-AD workers, the job in performed very infrequently or if workers are not familiar with the work area and the related hazards.

5.2 A pre-job walk-down provides an opportunity to see the jobsite firsthand and assess the physical aspects of the job. For example, interferences of equipment or other work done simultaneously; verify adequate clearance boundaries; verify safety equipment needs; determine if there is adequate lighting, the need for temporary power; see where radiological contamination or hot spots are located; verify proper tool and parts are available; verify adequate resources are available for the work; validate the job scope, etc.

6. Post-job Review

6.1 Feedback via the post-job review provides supervisors, work planners and management, with an important and fresh source of information about task-specific performance. Such information can be used to improve the organization of work, increase productivity, and help identify opportunities to strengthen defenses against error and events, and to eliminate error precursors embedded in the task.

6.2 Preferably, the post-job review is a simple, brief, and painless means of gathering information from workers about the work (planned versus actual), and should last only a few minutes, depending on the complexity of the job completed.

6.3 Supervisors do not necessarily have to lead this discussion; workers can be made responsible for this activity and provide the results to the supervisor, along with related paperwork. If necessary, problem reports are submitted. This information is, in turn, acknowledged and incorporated into the corrective action process, as appropriate, to support future job performance.

6.4 To reinforce the communication of feedback, inform personnel as to how their feedback was resolved. Similar to the goal of operating experience, post-job reviews attempt to *get the right information to the right person(s) in time to prevent an error* and, ultimately, an event for the next operation. The right person in this case is the responsible C-AD work planner, supervisor or manager.

7. Some Common Feedback Questions

7.1 Individuals should review their performance by asking themselves questions similar to the following to identify flawed defenses, error precursors, and weak processes for resolution by C-AD management:

7.1.1 Were there any surprises? Was the task accomplished with expected results?

7.1.2 Were procedures (or work packages) accurate? Is this the way the job should be performed in the future?

7.1.3 What specific errors occurred during the task? What job-site conditions were associated with errors, flawed defenses, or near misses?

7.1.4 Was the supervisor aware of conditions (precursors) that, if uncorrected, could lead to human error the next time the task is performed?

7.1.5 Were planning and scheduling optimized to reduce the potential for human error?

7.1.6 Were job-site resources and information sufficient?

7.1.7 Was training for the job appropriate and effective?

7.1.8 Were work processes efficient and supportive?

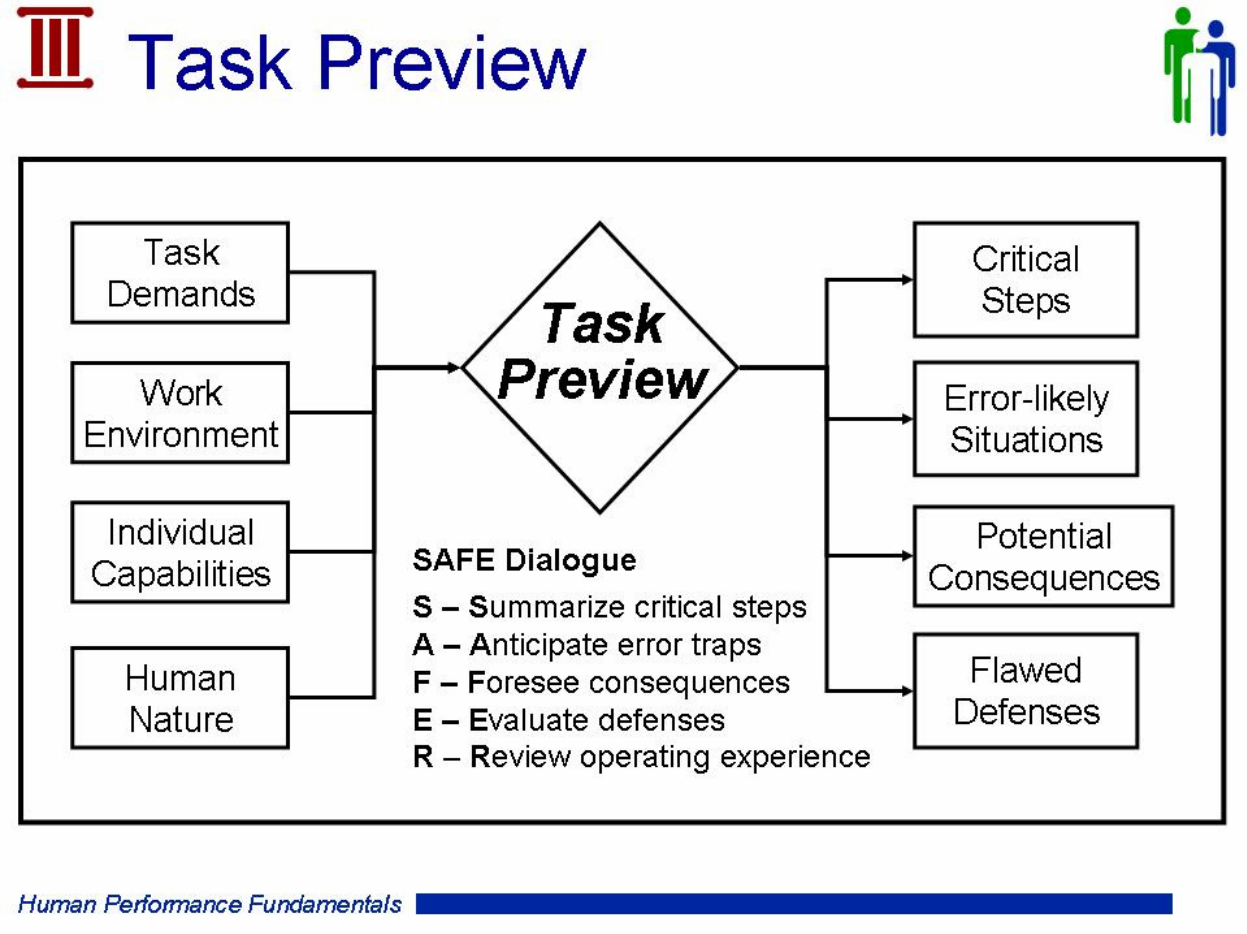
7.1.9 Were there any lessons learned from this job that should be recorded and passed on to others?

7.1.10 Did supervision provide needed support and appropriate guidance when necessary?

8. References

1) Human Performance Fundamentals Course Reference, National Academy for Nuclear Training, December 2002, Revision 6, Institute of Nuclear Power Operations.
2) Excellence in Work Management, September 2002, INPO.
3) Work Packages Reviews and Walk-downs, The Nuclear Exchange, July 2002, INPO.

ATTACHMENT 1.0 – "SAFER"



1. This task preview tool promotes structured, error-specific thinking and dialogue among work team members. This framework helps the user break old habits of thinking, encouraging imagination while sifting through job-site conditions to detect hazardous situations.

2. To identify specific error traps in a job, workers and supervisors should analyze the set of job-site conditions for error precursors (that is, task demands, work environment, individual capabilities, and human nature).

3. Information about task demands and the work environment is available from procedures and by physically walking down the job site. Preferably, the assigned worker(s) performs the walk down.

4. Information about the individual is available through reviews of their qualifications, experience, readiness to perform, and individual motives. Relationships among team members should also be considered.

5. The level of communication among workers, the supervisor, and perhaps others on the team depends on the trust among them and their appreciation for human fallibility. Open relationships are crucial for an intelligent dialogue during the pre-job briefing, and for a willingness to coach and challenge one another during work activities.

6. The following **SAFER** structure aids workers in anticipating, preventing, catching, and recovering from error during a task:

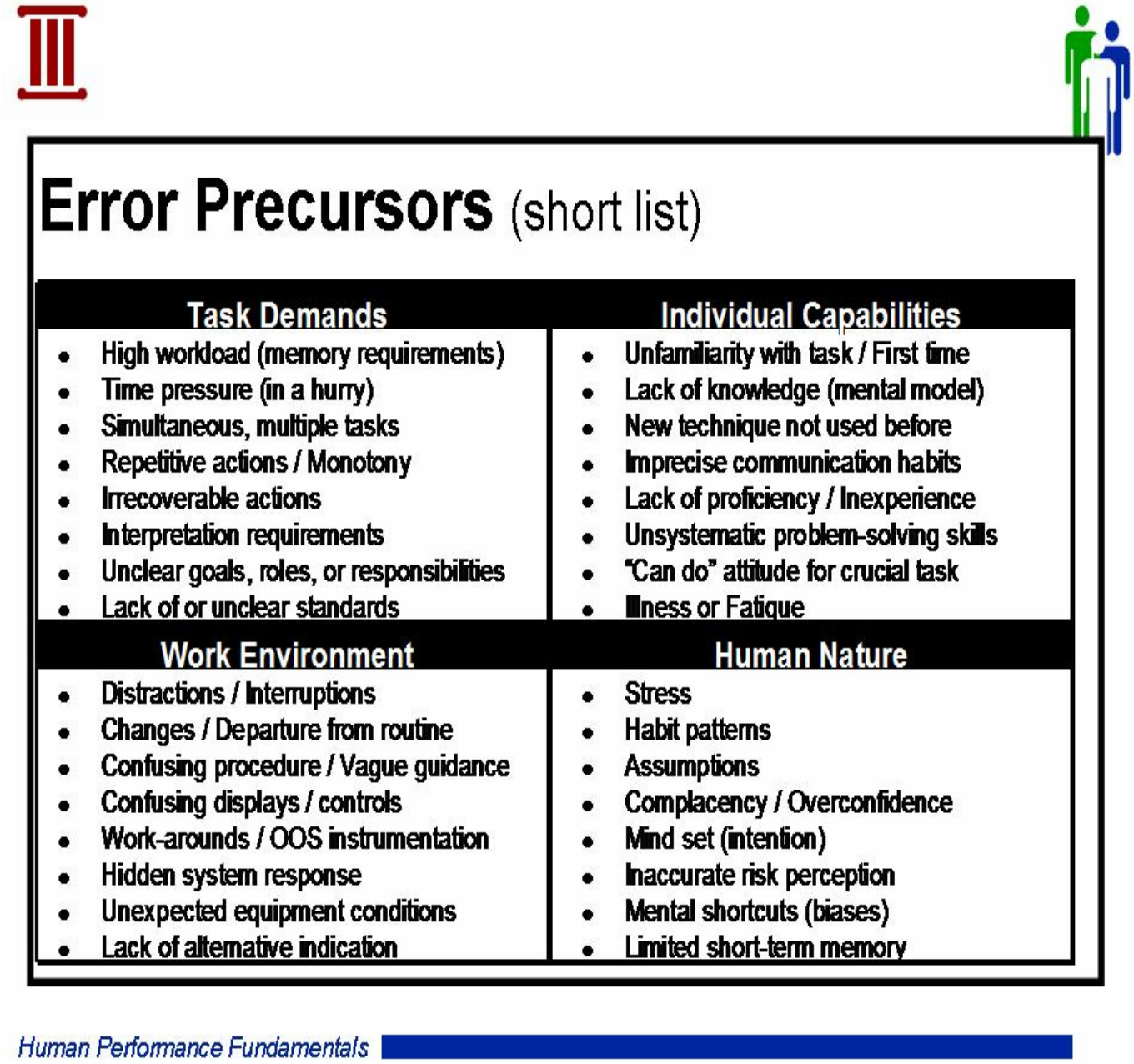
   6.1 **Summarize critical steps.** Not all steps of a procedure are equally important, particularly if the job is judged risk-significant. When it comes to plant equipment, actions aimed at changing the state of structures, systems, or components get higher priority. Many of these steps are considered *critical*. For instance, some steps are irrecoverable; once the action is taken, the reverse action cannot recover. Some steps become critical because human contact is frequent, meaning there are more chances for error. Some steps may be critical only during transient or steady-state conditions. To be considered a critical step (or phase a task) two conditions must be satisfied:

      6.1.1 The *state* of the plant, system, or component or well-being of the individual depends *solely* on the individual worker.

      6.1.2 The outcome of the error is *intolerable* for personnel safety or the plant (<u>independent</u> of when the consequences are realized).

   6.2 **Anticipate error-likely situations.** A review of job-site conditions could reveal error-prone steps or activities in the task. The presence of error precursors, such as workarounds, may be troublesome during critical steps.

      6.2.1 Error precursors are unfavorable factors embedded in the job site that increase the chances of error during job performance by a particular individual.



6.3 Some error precursors are particularly potent, depending on the performance mode of the individual performing the action. For instance:

6.3.1 *Distractions*, *simultaneous tasks*, and *fatigue* strongly influence skill-based performance. Skill based performance is associated with highly practiced actions in a familiar situation usually executed from memory without significant conscious thought.

6.3.2 *Mindset* and *confusing procedures* influence rule-based performance. Rule based performance is behavior based on selection of stored rules derived from the worker's recognition of the situation such as well known written procedures.

6.3.3 A*ssumptions*, *first-time performance of the task*, *lack of knowledge*, and *inexperience* influence knowledge-based performance. Knowledge-based performance is behavior in response to an unfamiliar situation that relies on personal understanding and knowledge of the system, the current system configuration, and scientific principles and fundamental theory related to the system. What errors have occurred with this activity in the past? Capturing errors in the form of a task or job history can better prepare workers for the same task in the future.

6.4 **Foresee consequences.** If a mistake does occur at the critical steps, what is the worst that can happen to the people, the environment, the physical plant? What is likely to occur? Consider the production/program goals that would not be achieved. However, safety and prevention are more highly valued. Intolerance for error-likely situations should prevail. If the potential outcomes of error are judged as too severe, the task should not proceed as presently planned.

6.5 **Evaluate defenses.** Fundamentally, defenses should prevent, catch, or recover from error. This stage of SAFER is the best time to determine contingencies for potential consequences of error, rather than later during job performance.

6.5.1 Since error-prevention is situational, this stage requires thinking about necessary defenses in light of potential errors, errors that have occurred before, and consideration of the worst that could happen during the given task.

6.5.2 Additional defenses should be put in place for specific steps in the task to guard against an error or an event. The pre-job briefing/walk-down provides an opportunity to identify recovery methods should undesirable errors or consequences occur.

6.5.3 Workers need to recognize when the original task has changed to a different task, such as when preventive maintenance transitions into a troubleshooting situation.

6.5.4 The *rule of threes* is worth considering: "If three things go wrong before starting the job, don't start. If three things go wrong during a job, stop." Three is based on studies that show the human mind's limitation to accurately attend to more than three issues at a time, especially in stressful situations. Participants should decide whether or not to proceed with the task as planned.

6.6 **Review operating experience**. The first four elements of the task review address what might happen. This step addresses what has happened, either at your station or in the industry. Operating experience helps dispel the attitude that nothing can go wrong. What events have occurred related to this task? How have people made mistakes with this task in the past? Is access to operating experience information in support of pre-job briefings convenient ("just-in-time)?

7. Methodically check the "safety nets" necessary for successful performance of the task.

7.1 Analyze a task to explicitly identify the following:

7.1.1 Essential defenses important for task success

7.1.2 Defenses (barriers) for likely error(s) and worst-case consequence

7.1.3 Missing or flawed defenses necessary for preventing, catching, and recovering from error

7.2 In most cases, additional defenses employed to minimize the risk of an error or an event for a particular task will be administrative in nature, such as additional supervision, use of specific job-site error-prevention techniques, or improvements in procedures or job aids.

7.3 Contingencies should consider defensive functions to enhance the individual's and plant's ability to recover from error, especially at the critical steps, to avert an event. Information regarding unanticipated presence of error precursors, occurrence of errors, and other threats should be fed back to management via a problem report or the post-job review.